

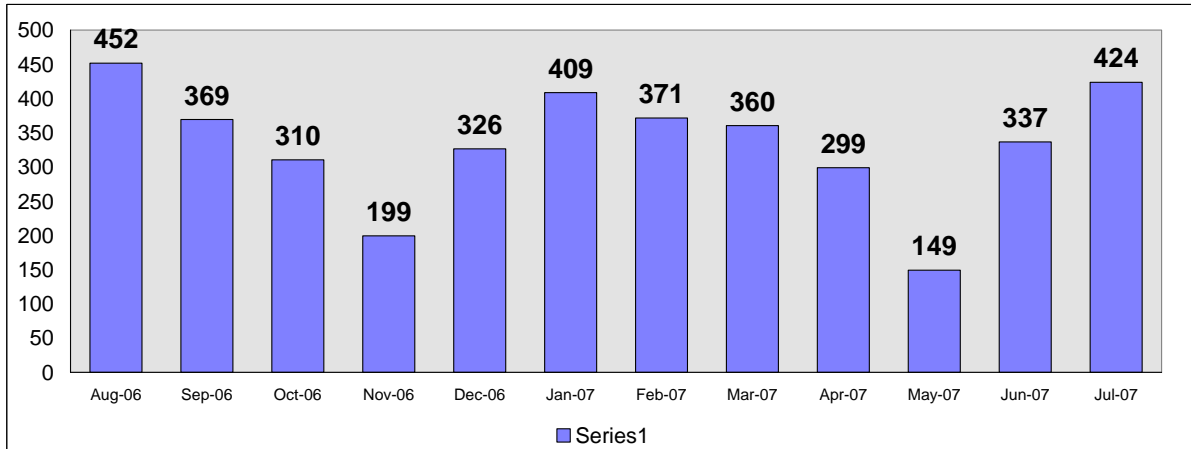
Water Savings Analysis for St. Regis Resort

Very few water conservation studies have been completed for the hotel sector. The main reason for this is because there is considerable variation in water use by the various types of hotels. A few studies suggest that water usage averages between 100 gallons per day (gpd) per room to 400 gpd per room. Age, size, class of hotel, type of cooling, on-site laundry, irrigation needs, swimming pools, and the existence of full service restaurants have all shown to have a significant effect on total water use.

Water Usage at St. Regis Resort Hotel:

Currently the average annual water use at the St. Regis Resort hotel is 336 gpd. This usage varies by season, but in our opinion is higher than it should be based on the type of hotel and the amenities provided.

Date:	8/21/2006	9/26/2006	10/23/2006	11/24/2006	12/20/2006	1/23/2007	2/23/2007	3/22/2007	4/23/2007	5/22/2007	6/22/2007	7/23/2007	Total
# of Days:	31 Days	36 Days	27 Days	32 Days	26 Days	34 Days	31 Days	27 Days	32 Days	29 Days	31 Days	31 Days	367
Reading:	162660	165120	166670	167850	169420	171990	174120	175920	177690	178490	180420		
CONS:	2590	2460	1550	1180	1570	2570	2130	1800	1770	800	1930	2430	22780
ADC:	452	369	310	199	326	409	371	360	299	149	337	424	336



Most of the charges for Water and Wastewater from the City of Aspen are fixed, but there is a variable charge that is based on consumption. This charge currently averages out to be \$1.70 per thousand gallons.

Factors Affecting Hotel Water Usage:

Percentage of water use by end-use category (domestic, kitchen, laundry, etc.) varies considerably from one hotel type to the next. For example domestic water use can range from as low as 30% for a Resort type hotel to as high as 76% for an Economy type hotel.

Water Usage by Hotel Type			
Hotel Type	Gallons per day / room	Gallons Domestic	% Domestic
Deluxe / Resort	175	53	30%
Luxury	120	54	45%
Mid Market	100	53	53%
Economy	70	53	76%

Water Management, Inc. (WMI) has begun to compile statistics for different types of hotels and we have found that guests use toilets 4.8 times per day and wash their hands with each toilet use for an average duration of 6 seconds per use. Two additional minutes per day of bathroom sink use is allocated for other uses. Shower use per day is an average duration of 8 minutes per use. If you also assume that the average occupancy is 1.5 guests per room and there is an occupancy rate of 80% then the water use for a typical guest room with older toilets regardless of the hotel type is calculated to be approximately 53 gallons per day.

Stipulated Savings Calculations:

Calculating the savings from replacing fixtures in the bathrooms of hotels is typically done by stipulating the savings based upon the average flow rate and flush volume for each fixture that is being replaced and multiplying that by a factor based upon usage patterns (see attached spreadsheet).

Usage profiles for bathroom fixtures in a hotel are based on three parameters, number of guests per room, the frequency of use of these fixtures, and the occupancy rate. The usage profile includes all guest uses and all uses by housekeeping during cleaning (typically housekeeping flush toilets 1-2 times per day).

The problem with using the stipulated savings technique at the St. Regis is that in our opinion it significantly underestimates the water savings that can be realized from replacing the older Kohler toilets. We believe savings projections are underestimated because they do not take into consideration the use that occurs from double flushing, deteriorated flappers, leaking fill valves, handles that need to be jiggled and a number of other problems that occur with inefficient toilets.

At St. Regis estimating how much additional water can be saved as a result of replacing the guestroom toilets is difficult but it is our belief that the difference is significant. We believe that approximately 20% of the older Kohler toilets are leaking an average of 0.25 gallons per minute. Eliminating these hidden leaks by replacing the older toilets will have a significant impact on the return on investment. **Based on the stipulated savings technique the total savings for the hotel will only be a little over 1 million gallons annually or \$1,600 per**

year. However when leaks are factored into the equation we believe that the actual savings will likely exceed 9 million gallons annually for an annual savings of more than \$15,000 per year.

Rate	gal / mth
1 drip / second	268
5 drips / second	1,339
1 cup (8oz) / minute	5,580
1 gallon / minute	44,640
4 gallon / minute	178,560

Leaks play a major role in increased water use and as the table illustrates even a small leak can have a significant effect on water use.

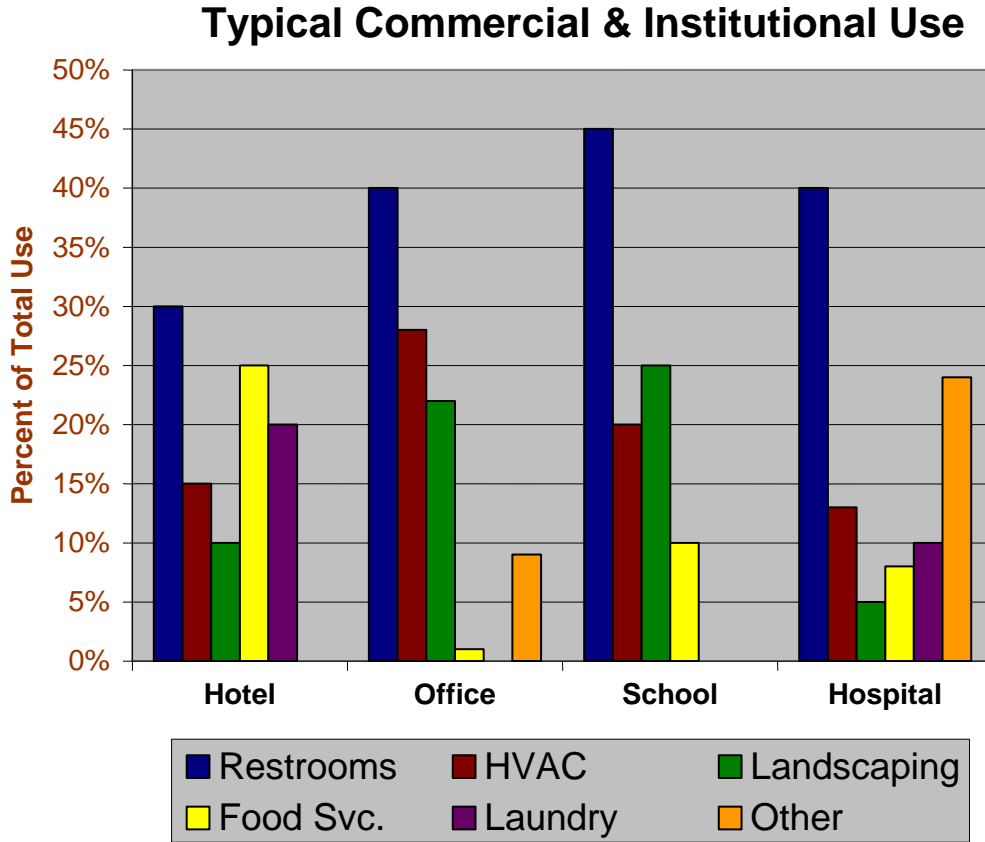
It is our belief that whenever domestic usage significantly exceeds 53 gpd – the excessive usage is caused by silent toilet leaks and/or old and outdated equipment. The leakage rate table illustrates that if a toilet is leaking at a rate of 1 gallon per minute; it wastes a total of 44,640 gallons each month or 1,440 gallons per day.

Water Management’s Unique Offer:

We are so confident that the Toto 1.28 HET UltraMax toilets will reduce the water usage at St. Regis by more than expected, that we are willing to discount our price by 20% (approximately \$15,000) in exchange for 50% of the actual savings realized over the next five years of billing from the City of Aspen.

Appendix - Additional information:

Water Usage by Industry Sector (per Water Conservation Guide for Commercial, Institutional and Industrial Users, New Mexico Office of the State Engineer, July 1999):



Above is an example of water use as reported in the Water Conservation Guide for Commercial, Institutional and Industrial Users, New Mexico Office of the State Engineer, July 1999. Guide was prepared by Shultz Communications, Albuquerque, NM with financial assistance given by the US Bureau of Reclamation.

Sample Water Balance for two selected hotels

